

REMARKS

It is noted, with appreciation, that the Examiner has indicated that claims 4, 5, 7, 8 and 10-13, although objected to as being dependent upon a rejected base claim, would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Also, the Examiner has indicated that claims 5, 11 and 13 are considered allowable subject matter since these claims depend upon allowable claims.

Claims 1-3, 6 and 14 have been rejected by the Examiner under 35 USC 102(b) as being anticipated by Couwenhoven et al., U.S. Patent 6,354,689. Also, claim 9 has been rejected by the Examiner under 35 USC 103(a) as being unpatentable over Couwenhoven et al. in view of Koitabashi et al., U. S. Patent 6,908,176. These rejections are respectfully traversed.

The present invention is directed to a printer and to a printing method for a printer containing a transport system for a recording medium, and a print head with a plurality of print units, each of which is capable of printing a pixel line when the print head is scanned over the recording medium, wherein a failure compensation unit controls the print operation and compensates for a failure of a print unit. More particularly, the present invention provides a printing method and a printer that are capable of optimizing the failure compensation strategy in terms of productivity and image quality for a large variety of images to be printed. Advantageously, segmentation is employed for automatically switching between different failure compensation strategies so that each segment of image will be printed with a failure compensation strategy that is most suitable for the type of image information contained in the respective segment. Thus, for example, when a page to be printed contains both dark and bright image areas, it is not necessary to use a relatively slow failure compensation strategy, which assures a good image quality in the dark areas, for the whole page, but rather it is possible to use this slower strategy only where it is actually needed, whereas other parts of the page, that is, the bright image areas, can be printed with a more productive failure compensation strategy which nevertheless provides a sufficient image quality in these areas. As a result, it is possible to achieve a satisfactory image quality and nevertheless to increase the overall productivity of the print operation. The segments identified in the segmentation process have advantageously

consisted of swats or bands that extend over the whole width of the page and correspond to an integral number of strokes of the print head. The part of the segment that is most sensitive to failure of a print unit will determine the compensation strategy to be adopted. According to the present invention, the segmentation unit is configured to search for critical, nozzle failure sensitive, image items such as thin horizontal lines, so that an appropriate failure compensation strategy may be applied proactively or precautionarily.

In defining the printing method of the present invention claim 1 recites the step of dividing an image to be printed into segments containing different types of image information. In defining the printer for conducting the present printing method, claim 14 recites the presence of a segmentation unit which is provided for dividing an image to be printed into segments containing different types of image information. It is believed that the Couwenhoven et al. patent does not contain or even remotely suggest the concept of dividing an to be printed into segments containing different types of image information. On page 2, in paragraph 2 of the Examiner's Office Action, the Examiner argues that the Couwenhoven et al. patent discloses the concept of dividing an image to be printed into segments containing different types of image information in Col. 5, lines 9-16 of the reference patent. However, in referring to this portion of Couwenhoven et al. patent no reference is made therein to dividing an image to be printed into segments containing different types of image information. The Couwenhoven et al. patent describes the nozzle failure camouflage procedure for a multitone ink jet printer when used in a multi-pass mode. A multi-tone printer is capable of expelling dots of plural sizes. The multi-pass mode is such that multiple nozzles are capable of printing along the same lines/path, which is referred to as a nozzle group by the Couwenhoven et al. patent. In the case where a nozzle or a nozzle group fails, other nozzles of the same group may still be capable of rendering their image data. The Couwenhoven et al. patent thus suggests that when assigning image data to a particular nozzle, two parameters are taken into account. First, the mal-performance value of a nozzle, which is an indication of the likelihood of failure is considered, and secondly, a state importance value is considered, which is an indication of the dot size which has to be rendered by each nozzle of a nozzle group. By taking into account these two parameters, the visual affect of a failing nozzle can be limited by not assigning image data to a failing nozzle or at least less

sensitive image data (the emission of larger dots caused by nozzle failure has a larger effect on image quality compared to the omission of smaller dots), but rather assigning the sensitive image data to another nozzle of the same nozzle group which is unlikely to fail. Thus, the Couwenhoven et al. patent describes a particular nozzle failure compensation strategy. In contradistinction to the present invention as defined in claims 1 and 14, the Couwenhoven et al. patent clearly does not describe or even remotely suggest the concept of dividing an image to be printed into segments containing different types of image information, such as for example, text, graphics, photographs, and the like, and furthermore, the Couwenhoven et al. does not suggest selecting a dedicated compensation strategy for each segment.

In connection with the rejection of claim 9, the Examiner clearly recognizes on page 5 of the Office Action Letter that the Couwenhoven et al. patent does not teach the step of dividing the image into segments including the step of extracting a primary image classifier from each area of the image. Since the Koitabashi et al. patent in Col. 6, lines 3-6 and lines 29-33 fail to provide the deficiencies in the Couwenhoven et al. patent, for the same reasons as discussed hereinabove, it is believed that the combination of Couwenhoven et al. patent and the Koitabashi et al. patent does not suggest the present invention.

Accordingly, in view of the above remarks reconsideration of the rejection and allowance of all of the claims of the present application are respectfully requested.

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Respectfully submitted,

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